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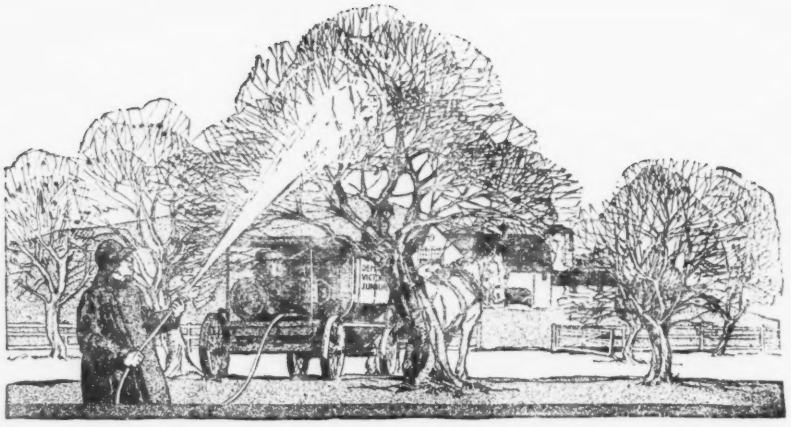
THE CORNELL COUNTRYMAN

ORGANIZING AGRICULTURE AS A BUSINESS - - - - E. DAVENPORT
AMERICAN POTASH IN CROP PRODUCTION E. O. FIPPIN
MILKING MACHINES - - - R. S. BREED

APRIL



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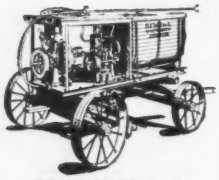

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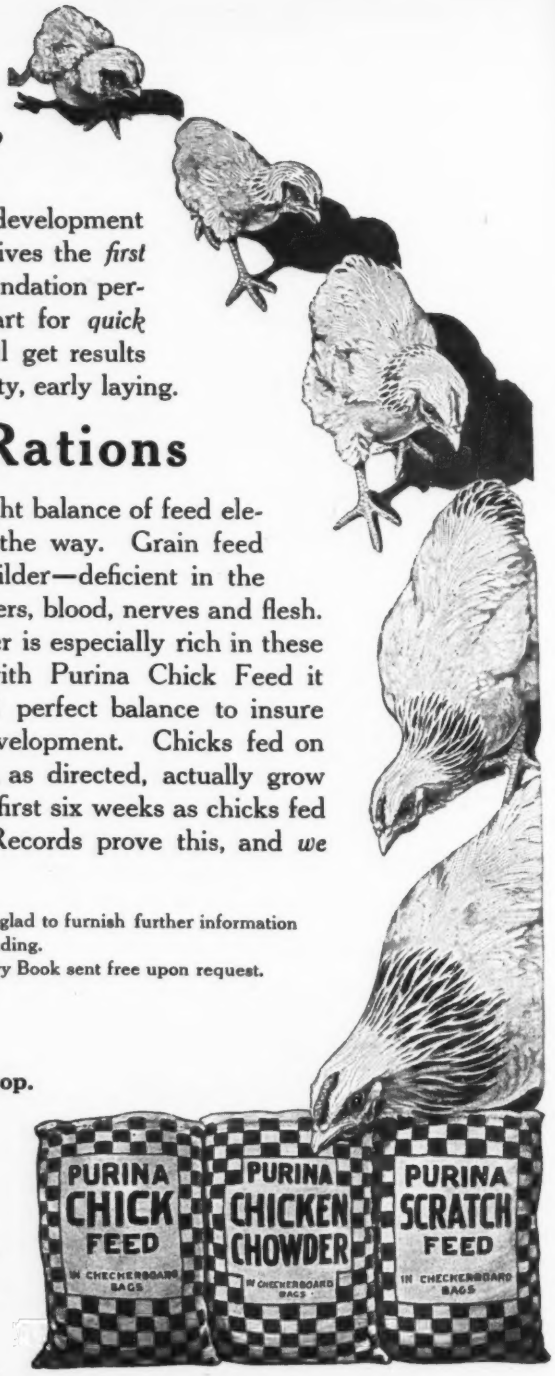

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THE CORNELL COUNTRYMAN

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Organizing Agriculture as a Business

By E. DAVENPORT

Dean of the Agricultural College of the University of Illinois and Director of the State Experiment Station

THERE are many indications that we of the United States are growing into a new era of agricultural organization and development. Heretofore and for the most part, farming has consisted mainly in getting a home and paying for it by selling on the open market whatever commodities the farmer might be able to produce. To be sure, in many sections, particularly in the West, production has been carried on upon so large a scale as to constitute a money-making enterprise almost from the beginning. But even so, farming has been intensely individualistic.

Dean Davenport was one of the principal speakers at the recent Farmers' Week at Cornell. He is recognized as one of the leading economists of this country with respect to the business problems of the farmer. In this article he points out that if the farmers as producers were organized in such a way as to do business efficiently with the distributing agencies, their business problems would largely be solved.

Farmers have long associated themselves for various purposes, mainly educational, by which is meant the exchange of experience and the discussion of the application of scientific principles to the business of agriculture. Meetings and associations of this kind have vastly multiplied in recent years, corresponding closely to the development of the agricultural colleges and the results of investigation as obtained by the experiment stations.

Following this impulse we have had state and local associations for farmers' institutes, for fairs, and for expositions, and we have had all kinds of specialized associations, such as horticultural societies and dairyman's and stockman's organizations, not to mention pedigree associations for every one of the fifty or more recognized breeds of livestock.

The chief purpose of all these organizations has been the increase and refinement of production thru the practice of better methods, and under their impetus we have been moving gradually away from pioneer farming to the self-sufficing sort, to the more or less finished agriculture which we may expect to enjoy under the settled conditions of a well-developed country.

The financial side of farming first came to the front a half century ago, contemporaneous with the organization of the Grange, when it seemed to farmers generally that much could be gained by cooperative buying. The principle is undoubtedly sound in so far, at least, as the farmers are not served by the

ordinary channels of trade. For example, it cannot be said that farmers have yet been even fairly served either by the fertilizer or the seed business of the country, having suffered at these two points thru a system of adulteration not far removed from the criminal; and as matters are going now, farmers are nearly as ignorant of what they buy in the form of stock feed as of what they have been taking in the form of fertilizers and farm seeds.

In respect to securing these commodities, therefore, the farmers have felt obliged to cooperate, tho strangely enough the energy of cooperation has been expended more along the line of ordinary merchandise than in correcting some of the special evils under which the farmers suffer. It is probably true that farmers cannot afford to combine for the purchase of groceries or other commodities which ought to be kept by the local merchant, and the general business of catering to the farm trade should be so improved as to make it unnecessary that the farmers should be obliged to combine for the purchase of standard commodities of any kind.

The farmer as a business man is much more a seller than a buyer. Outside of fertilizers, seed, and stock feed, he buys few things that are not purchased by other classes of people. He does produce for sale, however, a tremendous tonnage of all sorts of food that must make its way by all sorts of routes to the farthest corners of the world. Production by the individual farmer is for the most part a small business, but the distribution of the food stuff of the world is big business. One of our difficulties is that farmers as producers are not organized in such a way as to do business most advantageously with the distributing agencies, which of necessity must be highly capitalized and strongly organized.

The western fruit growers were the first to discover that in order to market farm products advantageously at any considerable distance, local associations must be formed. If food production could be as well organized for business purposes as are the fruit producers of our western slopes, it is unquestionably true that farming would be more profitable to the individual and food would be cheaper to the consumer.

The system of county farm bureaus now being organized in all the states of the Union, and these in turn combining into some sort of state federation or association, seem to constitute the best basis yet devised for developing agriculture from the business point of view. Heretofore and for the most part, farmers' organizations of a business nature have been limited to narrow lines, such as apples, grapes, milk, butter, cheese, Shorthorns, Jerseys, Holstein-Friesians, and so forth. This form of organization is tremendously effective in certain directions and for certain purposes, but in many respects the geographical unit promises better than the industrial unit for the purposes of business organization.

If the people of a whole county can agree upon developing certain specialties in that county, they are in a way to do business with large concerns, not so much upon the speculative as upon the contract basis; and this is the basis upon which agriculture ought to come to rest at the earliest possible date and to the greatest possible degree.

The Smith-Lever funds were appropriated by Congress as one among many efforts toward realizing a general agricultural development. I do not suppose the promoters of the plan had in mind a definite procedure. If so, it is not expressed in the terms of the act. It is therefore left for each state to develop its own method, and doubtless the conditions in the different states will determine to a large extent the form of development which this new movement should take.

It general, it seems to the writer that it is hardly worth while to multiply mere educational organizations among farmers or to use for a purpose already fairly well served such widespread and powerful organizations as the farm bureaus are capable of becoming. The college

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American Potash in Crop Production

By ELMER O. FIPPIN

Extension Professor of Soil Technology at Cornell University

THE coming of the war forced the making of a national experiment in fertilizing the soil. It cut off the supply of European potash and after the first year caused its practical elimination from fertilizer. Before the war, potash made up a large percentage of all complete fertilizers. That large percentage of potash was put there by two things: first, the ease with which a concentrated potash salt in the form of muriate of sulfate could be introduced, and second, by an aggressive selling propaganda pushed by the German Kali Syndicate.

In view of the large amount of potash present in normal soils, the need of so much potash in most of the complete mixtures was frequently questioned by members of experiment stations and college staffs. At the same time, their experimental data was inadequate to demonstrate the exact limits of the value of potash in the fertilizer for different soils, crops, and methods of soil management.

Potash is valuable for two principal reasons. The first and most prominent of these is to make possible the formation of starch. The potato being the most starchy of common plants, it would seem natural that a lack of potash should be promptly apparent in that crop. In the same way, vegetables in general would seem to be more susceptible to its lack than grain crops. It also has a bearing on the formation of proteid materials and its lack might be expected to appear in the legume crops. Experimental data available is a suggestion of that fact.

Need of Potash Slow to Appear

During the first year without potash, scarcely any change in crop yields was reported. Naturally, it had been most used on those crops of highest acreage value, namely, the vegetable and such special crops as tobacco.

The second year an increasing number of complaints came in, chiefly from vegetable growers on Long Island and the New England and Coastal Plain districts where the soils are most siliceous and lowest in total potash. In that year—1917—a questionnaire was sent to all members of the State Vegetable Growers' Association, bearing upon the effect of the lack of potash in the fertilizer. The observations indicated that the lowest percentage in the reduction of yield was corn with 15% and lettuce, 16%. The highest was tomatoes with 35%, the next onions 37%, potatoes 35%, and cabbage and celery 24 and 22%. Firmness as well as yield were also indicated in such crops as onions, cabbage, and lettuce.

In 1918 an increased number of reports of poor condition of vegetable crops came in, particularly from the potato growing districts of Maine, Long Island, and Virginia.

Indications of "Potash Hunger"

The lack of potash, so-called "potash hunger," expresses itself at first in shortened leaf petals and partially curled, bronzed, crinkled leaves of smaller size. Later, about the time the tubers have well begun to set, the plants go down with lesions on the stems, and a general dying of the tissues occurs, similar in gross outward appearance to blight.

Some irregularity appeared in the soil condition under which this trouble occurred. Sometimes it was associated with different types of soil. Variations from row to row were traced to the presence of windrows of potato tops plowed under. This organic vegetable matter resulted in a normal growth. In other areas, the normal growth of spots was traced to waste—cabbage leaves or rotten potatoes or some other source of vegetable matter that had been incorporated with the soil. Wherever manure

Increase in Value of Crops Produced by Different Fertilizers

Fertilizer	NEW YORK	PENN.	OHIO	
			Twenty Years	
	Total increase in value of 9 crops including 6 of hay and 3 of grain	35 yrs. corn, oats, wheat, clover. Net gain in value of crops per rotation	Corn, oats, wheat, clover, timothy. Increase in value	Potatoes, wheat, clover. Increase in value
Phosphorus	$ 6.99	$14.31	$16.52	$10.99
Potash	20.63	5.36	5.73	7.18
Nitrogen and Phosphorus	38.02	25.75	31.34	15.87
Phosphorus and Potash	19.60	33.60	24.69	20.91
Nitrogen and Potash	50.30	2.17		
Nitrogen, Phos. & Potash	66.61	33.94	39.28	22.27

had been used, even in small amounts within a year or two, the potato plants made a normal growth. Then, too, a few farmers had carried over fertilizers containing potash and this was pieced out with fertilizers lacking in potash. Where the potash fertilizer was absent, the weakened and diseased condition of the plants appeared in every row. Many observations in different regions have led farmers as well as college men to identify a condition of so-called "potash hunger," commonly attended by the diseased condition known as Phoma. By some the diseased condition is looked upon as merely the attack of weakened or dead tissues by common decay organisms usually present in soil. The weakened condition of the plant induced by the lack of potash may be conceived to open the plant to the attack of these soil organisms, which in turn cause premature breaking down of the tissues.

Field Experiments With Potash

For several years an experiment with fertilizer on potatoes has been conducted by the New Jersey Experiment Station at Elmer with the following results. The amount of fertilizer used was 1600 pounds.

The average increase was fifty-three bushels, apparently due to potash. It is

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Milking Machines

By ROBERT S. BREED

Bacteriologist at the New York Agricultural Experiment Station, Geneva

A COMMON inquiry reaching the Experiment Station during recent months has been, "Do you advise the purchase and use of milking machines on dairy farms?" This question is frequently accompanied by another: "If so, which of the machines now on the market do you regard as the most successful?"

The first question can be answered by referring to a recent circular issued by the Station (Circular No. 54). It begins with the statement that milking machines may be of great service on farms where twenty or more cows are kept. None of the machines now on the market are sufficiently fool-proof to justify the more positive statement that they are of use on such farms. Certain difficulties, either in mechanical operation or in keeping them clean, make it impossible to succeed with any of them unless more than ordinary care is given to their operation and maintenance. It is a waste of money for anyone to install a machine unless he is prepared to operate it so as to make it a success.

In purchasing a machine careful investigation as to the merits of the machines offered should be made, as the labor shortage has caused machines to be placed on the market whose value has not been demonstrated. Many companies, however, which have tried to make sure that they had a valuable article before placing it on general sale, have maintained dairy farms upon which they have tested the merits of their machines under practical conditions. A few companies have also realized that a machine milker, to be a success, must be more than a mechanical success and have employed experts to aid in devising simpler and more sanitary construction; but there is no evidence to show that some of the companies now selling machines have sought expert advice on this point. Therefore it is not surprising to find companies using unsuitable metals or alloys in the construction of their machines. For example, a common fault in machines recently placed on the market is to find aluminum used in places where it readily corrodes, and to find the selling agents recommending that dairymen use washing solutions or chemical disinfectants which are corrosive agents of this metal. Only the most resistant alloys or metals should be used for pails, pulsator, and teat cup parts. Nickel, silver, block tin, or heavily nickeled or tinned parts are as satisfactory as any that have come to our notice. Brass is unsatisfactory as it readily blackens and is always a difficult metal to keep brightly polished.

In view of these conditions, the dairyman who is thinking of buying a machine is justified in asking a third question before purchasing, namely, "How successful are practical dairymen with milking machines?" From the testimonials furnished by selling agents one would gather that milking machines are a success in the hands of every farmer; but it is worth noting that many of the testimonials are written within one year after machine milkers are installed and that inquiry will show that machine milkers are frequently discarded. In spite of the recent enormous increase in the sale of milking machines, it is probable that a careful census of the State would show at least one discarded outfit for each two that are still in operation.

An opportunity to study the success of the average dairyman with machine milkers in a restricted area has arisen at the Station during the past five years thru cooperation with the City of Geneva in milk inspection work. During this time seventy-four farms have supplied milk for sale in the city. Machine milkers were installed on sixteen of these farms at the beginning of or during this period. Only nine of these outfits are

still in operation. At least three of the nine have not yet been in operation for two years. No one type of machine has enjoyed a monopoly of the troubles, for out of the six types used on these sixteen farms, machines of four types have been discarded because of dissatisfaction, and the other types have only just appeared in the field. These figures may in a way be said to measure the success which the dairymen of Geneva have had in the mechanical operation of machines. But this is not the whole story.

Since samples of milk have been examined weekly since February 1, 1915, it is possible not only to compare the quality of the milk received from different hand and machine-milked herds, but occasionally, where machines have been installed or discarded during the period, to compare the quality of hand and machine drawn milk from the same herd. Very early in the work it became clear that the excessive bacteria counts which were found in about 17% of the cans examined were frequently associated with the use of milking machines.

In the majority of cases, all of the cans of milk from a farm where milking machines were in use showed approximately the same numbers of bacteria, this condition being more nearly invariable in the case of cans of milk of the same age. The bacteria present in microscopic preparations of the milk were rarely of the lactic acid type, being rather of miscellaneous types which occurred in masses of irregular size. So typical is the picture presented in microscopic preparations of milk drawn thru improperly cleaned milking machines, that the mere examination of samples of milk taken as received in Geneva has caused the inspection authorities to believe that milking machines were in use in the case of two dairymen sending milk to the city for the first time. Later this suspicion was confirmed.

The following figures from the milk inspection work speak for themselves. During 1918, 4,706 cans of milk have been examined of which 1,423 came from farms where milking machines were in use. An unsatisfactory rating was given to 594 cans because they contained bacteria in excess of 1,000,000 individual bacteria per c. c. Of these cans, 58 per cent came from the farms where milking machines were in use, altho only 30 per cent of the milk examined had come from these farms.

The 42 dairymen who have delivered milk more than nine months during 1918 have been arranged in a list in order of their success in delivering milk free from excessive numbers of bacteria. The highest position occupied by any one of the six men using machines was 15, while the others ranked 31, 35, 39, 41, and 42 in the list. Some cans of unsatisfactory milk were delivered from the best of these farms.

During all of this inspection period, members of the Station staff have endeavored to give the men using machines such help and advice as they could, hoping that it would be possible for the dairymen to make as good a showing with the operation of their machines as has been made at the Station. Numerous bacteriological tests have been made on these farms and the dairymen shown as far as possible the exact source of their difficulty, and the methods of cleaning used at the Station have been explained. The users of machines have also suffered some financial loss thru the return of sour milk or milk with bad flavors and tastes. But the above record shows that these things did not secure the results desired.

There appear to be several reasons for the failure to secure good results. In a large number of cases the dairymen failed to follow instructions; in fact, it cannot be said that any one of them consistently followed methods of cleaning as efficient as those used in the Station dairy. This, in many cases, was due to the fact that the machines were operated by an indifferent and inefficient grade of labor; but, in other cases, it was due to the lack of proper facilities for caring for the machines. Some failed to provide large enough crocks for the sterilizing solution used in disinfecting the teat cups and tubes, or failed to provide or care for these solutions according to di-

rections, or neglected other important matters. None of them had adequate facilities for heating the abundant supply of water necessary for rinsing after each milking. All were prone to listen to the advice of the selling agents, some of whom were guilty of reporting that it was a simple and easy matter to clean machines, that they could be cleaned by sucking cold water thru them, that the tubes would keep sweet if merely hung on a peg between milkings, that the cups ought not to be taken apart for cleaning, that some commercial disinfectant was better than the methods recommended by the Station, or other like statements.

But the blame does not rest entirely with the dairymen or with the selling agents, for trouble was experienced from the first because of the faulty and unsanitary construction of machines. In many cases teat cups or other parts of the machines were made of metals which corroded when brine, or brine and chloride of lime, were used as sterilizing agents, and nearly all were found to be unnecessarily difficult to clean, in that little attention had been given by the manufacturers to keeping surfaces smooth and free from cracks in which dirt accumulates.

There was indication in several cases that there was leakage of the foul condensation water present in the vacuum line into the milk pail, and few of the machines seem to be constructed with sufficient protection against this. One of the most difficult points in the construction of sanitary milking machines has been to provide a means of completely separating the milk from the current of air which brings the milk from the udder to the pail and which at the same time effectively prevents a return of the foul condensation water that accumulates in the vacuum pipe lines. Careless or inexperienced operators of several of the machine milkers under observation frequently drew milk into the air line or vacuum tank, thereby producing a very foul and unsanitary condition.

Unless the conditions described are corrected by immediate and vigorous action, the users of milking machines may suddenly find themselves confronted with edicts from city health authorities forbidding the sale of milk which comes from farms where machine milkers are in use. For many years some of the leading men in charge of the inspection work for the medical milk commissions have frowned upon the use of machines on certified farms. While machines have recently appeared on a number of New York State certified dairies because of the labor-shortage and some certified milk producers are enthusiastic concerning them, a consultation with inspection authorities who have had experience with the difficulties in the operation of machines will show that they are unanimous in failing to become enthusiastic over their indiscriminate use in certified dairies.

These facts will surprise many persons who regard milking machines as a great success because they aid in producing clean milk, i. e., clean in the sense that it contains little or no visible dirt or filth. However, if we regard microscopic masses of bacteria as dirt, then much of the apparently clean milk drawn by machine is very dirty indeed.

The recognition of the fact that New York State dairymen already have an investment in milking machines considerably in excess of $2,000,000, which may be very largely lost because of the inefficient operation and later discarding of this equipment, has caused the agricultural extension authorities at the State College of Agriculture to plan for milking machine schools at which instruction in the care and operation of milking machines will be given. The State Experiment Station is very glad to give such aid as is possible in making these schools a real help to dairymen using machines or who are planning to install them.

"Glista Ernestine" of the College herd has made five seven-day records above thirty pounds of butter. So far as it is known, there is but one other cow in the world that has done this, Segis Fayne Johanna.

Two Farm Necessities

By G. F. WARREN

Professor of Farm Management at Cornell University

THE problems of the reorganization of civilization are the great questions of the day, and two of the greatest needs in rural development are roads and high schools. Probably no other deficiencies in country life lead so many farmers to leave the farm as the lack of available high schools; and the few good roads that are now available are proving to be a tremendous help in farming.

Education is a government function. It is no longer determined by the desires of the parent or by his wealth. The principle of compulsory education is now fully established. The equally important principle that high school education should be free and available must be accepted. So long as there are so many farms with no high school facilities in reach, will progressive men be compelled to move to town when their children reach high school age.

High schools that are so far away that the children must leave home and pay board cannot properly be called available. Children of high school age should sleep at home. Furthermore, there are few farmers who can afford to send all their children thru high school if they must pay board. During Farmers' Week the author asked a former Dutchess County farmer why he moved to New Jersey rather than buy a farm in his home county. He stated that he certainly would have bought at his old home had it not been that he wished to send his children to high school. A few questions were asked, from which it developed that his father paid about $3500 in board to obtain high school facilities for his children. His brother, who lives in the home county, paid $1.00 a day for board for his son last year and this year the boy goes back and forth daily a distance of seventeen miles.

If the State desires persons to live on the farms and desires these persons to raise children, then the State should plan such a school system as will place education within the reach of every child.

Why should the State help small high schools? Is this not the duty of the local taxpayers? Either education is or is not a government function. If education is a government function then the State owes the same duty to one child as to another. It is now recognized that those things that need to be done but cannot be paid for locally should be done at the expense of the State or Nation. New York City does not pay all the expense of its harbor improvements, yet it is quite as difficult to show why a farmer in Alabama should pay taxes to improve the harbor in New York as it is to show why New York should help the education of the boy who is born on the hills of Steuben County. New York City and Buffalo do not pay all the costs of the Erie canal, yet it is not easy to show how this canal helps the resident of Elmira. In road construction the township pays for small culverts, the State helps on large bridges, and some of the largest bridges are paid for by the Nation. In many fields it is now recognized that what needs to be done for State and National welfare must be done at joint expense when the burden is too heavy for the local community. In any event the cities must pay in one form or another. They may pay taxes that will help bring modern education to the sparsely settled regions, or if they pre-

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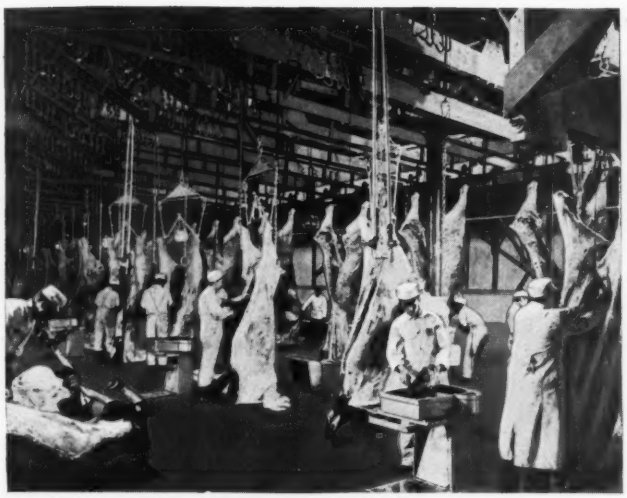
From Live Cattle to Beef

By L. D. H. WELD

Formerly Professor of Business Administration at Yale University



Where the Floorsman's Work Begins;—Only One of the Thirty-two Operations in a Modern Slaughter House

TO the uninitiated, the slaughtering of meat animals probably only means to dispatch the animal and pull off the hide. Those who have never witnessed the process in an up-to-date establishment have no conception of the varied handlings that are found necessary in the preparation of a carcass of meat and the skill that is required to obtain the best possible results.

Before explaining the many operations in connection with the preparation of beef, it will prove interesting to note that the live cattle are purchased in lots. Such lots may contain only one animal or even a hundred, according to how they are shipped in by the stockman. A lot consists of the animals bought by one buyer from the same source. The animals are slaughtered according to these lots, and each carcass is provided with a tag showing lot number, carcass number, and the dressed weight as it goes into the coolers. Separate weights are also taken of the hides and fats of each lot. All of these weights are turned into the cost figuring department, which determines the cost of beef and provides the buying organization with data showing how the various lots dressed out and how well each buyer judged the livestock he bought; likewise, the costs furnish the selling organization a guide as to what the beef needs to bring to avoid a loss in its handling.

Divisions of Labor in Cattle Slaughtering Operations

1. "Penning" consists of caring for livestock in the receiving pens at the packing house, and driving the animals up an incline to the top floor where dispatching compartments are located.

Under the old methods it was customary to take care of the preparation of by-products on the killing floor. This involved a tremendous amount of hand-trucking in disposing of the offal, and was not only an expensive way of conveying, but also interfered with the dressing of the carcasses, for the trucks were an obstruction.

This antiquated method has been superseded by that of placing the abattoir on the top floor above the floors where the many different by-products

are handled, and gravitating the offal thru chutes to the various floors as fast as it is taken from the carcass.

2. "Knocking" or stunning by means of a blow over the forehead with sledge hammer is the most humane method, for the animals drop without a moan or sense of feeling.

3. Shackles are fastened to the hind legs, so that the stunned animal may be hoisted to the bleeding rails for proper bleeding.

To avoid possible danger to the shackler, the dispatching compartment is so arranged that he is not required to enter it. The partial hoisting of the gate also tilts the floor of the compartment so that the carcass slides forward with its legs projecting.

4. The carcass is then hoisted to the bleeding rail. The bleeding process is more thoro and quicker when the animal is suspended.

5. The jugular vein is then severed by a skillful cut into the throat. The bleeding process is completed while the animal is still stunned. After bleeding, of course, there is no animation.

6. "Heading" consists of removing the hide from the head and unjointing the head so that it may easily be removed.

7. The carcass is then lowered from the bleeding rails to a position farther back on the floor and adjusted so that it will lay flat on its back for the skinning of the belly and sides. This process is known as "dropping and pritching up." The butcher performing this skinning operation is known as the "floorsman."

8. The "foot skinner" skins and removes the front feet.

9. The "leg skinner" skins the hind feet.

10. Then the hide is ripped clear down the belly and over the breast so the floorsman can begin his work.

11. The sternum is divided by means of a saw, the operation being called "sawing the breast."

12. "Sawing aitch" is dividing crotch bone.

13. The caul fat which covers the stomach is then removed.

14. The wind pipe is loosened from the neck to facilitate evisceration. This is done by the "gullet raiser."

15. The floorsman skins out belly and sides.

This is one of the most difficult operations in the whole process. To place a knife between the flesh and hide and not cut the hide or lacerate the meat, requires a great deal of skill. An ordinary puncture in a hide means a depreciation in value of one cent a pound or sixty cents a hide.

16. "Spreader men" attach a device known as a "beef spreader" to cords at the hock joint and shift the carcass to a position farther back on the floor.

17. The "hock puller" clears the hide from the hock joint.

18. The "leg breaker" removes the hind legs after the spreader has been inserted.

19. The "fell cutter" skins out the hind legs or rounds.

20. The "tail puller" removes the hide from the tail.

21. The "rumper" skins out the rumps.

22. The "fell puller" pulls the hide down over a wide flat tissue covering the hind legs.

23. The "fell beater" assists the fell puller by beating with the back of a cleaver on the hide to prevent tearing of the tissue referred to above.

24. The "backer" then skins the back.

25. The "rump sawyer" saws down the spine to the third vertebra, facilitating the work of the splitter.

26. The "gutter" performs the evisceration operation.

At this point in the operation, the Government inspector makes a thoro examination of all the vital organs, and if he finds any indication of disease, he tags the carcass so that it is switched into what is called the "retaining room," together with all the vital organs belonging to the carcass. Further examination is made here by another inspec-

(Continued on page 154)

Some Insect Pests of the Apple

By GLENN W. HERRICK

Professor of Economic Entomology at Cornell University

SOME years ago Dr. J. A. Lintner made a list of three hundred and fifty-six species of insects that are injurious to the apple. Many of these insects, in fact the majority, are not important. Probably the really serious pests of the apple may almost be counted on the fingers of one's two hands. They may be named in about the following order of injuriousness at the present time, considering the United States as a whole: codling moth, round-headed borer, woolly aphis, rosy aphis, apple leaf aphis, San José scale, bud moth, spring canker-worm, apple-tree tent-caterpillar, plum curculio, flat-headed borer, and apple maggot.

The codling moth is undoubtedly the most injurious insect pest of the apple. It occurs in every state in the union in which apples are grown and has been estimated to cause an annual loss of over $16,000,000 to the growers of this country. About one week after the petals fall from the apple blossoms, the majority of the small grayish moths appear (illustrated in the photograph above), and they soon begin to lay their milk-white eggs on the leaves and sometimes on the branches and young apples. The larger part of the larvae from these eggs enter the apples thru the calyx end and spend about 30 days in the apple. In New York there is a partial second brood of "worms" that appear during the last week of July or first week of August. These larvae enter the apple more frequently thru the sides of the fruit and only spend about three weeks in the apples.

The codling moth is controlled by spraying with arsenate of lead, 4 or 5 pounds to 100 gallons of water, as soon as the majority of the petals have fallen. This is the most important spray for this pest and should be done very thoroly. Many careful growers prefer to make a second application of poison about three weeks after the first, taking pains to produce a fine misty spray to coat the leaves and young fruit.

Next to the codling moth the round-headed apple-tree borer is considered the most serious pest of the apple. The handsome white-lined beetle deposits its eggs in crevices cut in the bark on the trunk of the tree in May and June and even later. The grubs hatching from these eggs bore beneath the bark, and as they grow older tunnel deeper and deeper into the wood. They usually work near the ground and often ruin trees, especially young ones. In New York the insect probably has a three-year life cycle, but farther south the grubs may mature during the second summer, thus completing the life cycle in two years. This pest is worse in orchards that are grown up to grass and weeds. Therefore, clean culture is a fine preventive measure. The surest method of control is to cut the borers out by hand with a sharp chisel. The wounds should be given a coat of gas tar to prevent the entrance of fungi. Wrappings of newspaper extending about two feet up the trunk of the tree and tied on with cord which will yield or break with the growth of the tree, are said to give excellent protection from the borer. The papers should be put in place early in May.

The rosy aphis and the apple-leaf aphis are apple pests much dreaded by the grower. Each of these aphids in the fall lays its tiny black, shining eggs on the branches of the apple where they remain until spring. As the buds begin to swell and show signs of opening, the eggs hatch and the young lice cluster on the opening buds. The rosy apple aphis is purplish-brown in color and usually covered with a white mealy substance (wax). At least three generations are produced on the apple. Some of the individuals of the third generation and probably all of the fourth generation are winged and fly from the apple-tree to the broad-leaved and narrow-leaved plantain where the summer is spent, the aphids returning to the apple in the fall and depositing their eggs, thus completing the cycle. The apple leaf-aphis lives on the apple the whole year and is probably the worse pest of the two species. These aphids stunt the succulent growth of branches, curl the leaves, and deform the fruit.

They are best controlled by spraying with nicotine-sulfate, ¾ of a pint to 100 gallons of water, to which 4 or 5 pounds of soap have been added. The application should be made just as the buds are breaking, for at this time the young nymphs which are clustered on the buds are easily killed.

The bud moth is widely distributed in the northern part of the United States from Massachusetts to Oregon and is a destructive pest of the apple. The adult is a small, dark, ash-gray moth with a broad, cream-white band across the middle of each fore wing.

The partly grown, brown larvae pass the winter in silken cases placed near a bud or under a scale of bark. In the spring these tiny caterpillars become active and begin to eat into the swelling buds. As the buds develop the larvae tie the leaves together and live inside the tangled mass where they finally change to pupae during the month of June. In about 10 days the moths appear and lay their tiny eggs on the under sides of the leaves. In 7 to 10 days the eggs hatch and the young caterpillars eat off the epidermis of the leaves so that only a network of veins is left. In

(Continued on page 148)

TIME	MATERIAL	FOR WHAT
Before buds start	**DORMANT** Lime-sulfur 1 to 8	Scale, blister mite
When leaves of blossom buds are out ¼-½ inch	**DELAYED DORMANT** Lime-sulfur 1 to 8 "Black leaf 40" ¾ pt. in 100 gals. (Arsenate of lead 5-6 lbs. in 100 gals.) (If this spray is applied it will not be necessary to make the "dormant" application	Scale, blister mite Aphis (Leaf roller, case bearers)
When blossoms show pink	**BLOSSOM-PINK** Lime-sulfur 1 to 40 Arsenate of lead 5-6 lbs. in 100 gals. ("Black leaf 40" 1 pt. in 100 gals.)	Scab Bud moth, case bearers, etc. (Dark apple red-bug)
When the last of the petals are falling	**CALYX** Lime-sulfur 1 to 40 Arsenate of lead 5-6 lbs. in 100 gals. ("Black leaf 40" 1 pt. in 100 gals.)	Scab Codling moth (Bright apple red-bug)
To be determined by weather conditions and control of scab	**LATER SPRAYS** Lime-sulfur 1 to 40 Arsenate of lead 5-6 lbs. in 100 gals.	Scab Codling moth, other caterpillars

Summary of the time and materials used in spraying an apple orchard

Cornell's Semi-Centennial

By WOODFORD PATTERSON

Secretary of the University

IN June, 1919, Cornell University will celebrate its semi-centennial. This celebration was planned for the autumn of 1918 in order to mark the fiftieth anniversary of the opening of the University. It was postponed on account of the war, and now it will serve to commemorate the fiftieth anniversary of the first Commencement.

Three days have been appointed for the celebration. They are Friday, Saturday, and Sunday, June 20, 21, and 22. The Commencement exercises will take place on Monday, June 23.

It is planned to make this celebration a grand home-coming of alumni, and preparations are being made to receive several thousand persons. There will be a reunion of every class. The event will probably be accompanied by the largest assemblage of Cornellians that has ever taken place.

The semi-centennial celebration proper will be held on Friday morning, June 20. Charles E. Hughes, Governor Alfred E. Smith, and Judge Frank H. Hiscock, '75, will be the speakers. Judge Hughes was a member of the Faculty a quarter of a century ago, and Governor Smith is ex-officio a member of the Board of Trustees. Judge Hiscock is chairman of the Board of Trustees. This meeting will be held out of doors, perhaps in the football stadium if the weather is fair; otherwise, probably in Bailey Hall.

At noon on Friday the President and Mrs. Schurman will give a reception to the alumni in the New York State Drill Hall, where a luncheon will be served. Friday afternoon has been set apart for a conference in each college, of faculty members and alumni, to consider the problems of the college. The purpose of this series of conferences is to acquaint the alumni with the present work and outlook of the college, to give them a chance to meet former teachers, and to let them contribute whatever they may have of experience or suggestion. The plan to hold such conferences recognizes that important changes in educational ideals and methods may be a result of the world war. Each college is arranging for such a meeting, as are the departments of chemistry and physics.

The University will give a dinner to the alumni on Friday evening. The dinner will be served, probably, in the new drill hall. The names of the speakers on that occasion have not yet been announced.

Saturday morning will be devoted to the annual meeting of the Associate Alumni, which organization has had this whole day assigned to it and has arranged the program for the day. The morning meeting will be given to an exposition of the organization and plans of the general alumni association. Relaxation will be the rule for Saturday afternoon, when there will be a baseball game, probably with the University of Pennsylvania, on Percy Field. On Saturday evening the alumni will again assemble in the great drill hall for class dinners and a general alumni smoker, again under the auspices of the Associate Alumni.

The University's statue of Ezra Cornell will be unveiled on Sunday morning, June 22. This statue is cast in bronze from a design by the sculptor, Herman Atkins MacNeil, who was once an instructor in Sibley College. It stands between Morrill and McGraw Halls, facing the statue of Andrew D. White across the Quadrangle. The statue and its pedestal were completed and set up last fall. Professor T. F. Crane will be the chief speaker at the unveiling. John R. Mott, '88, will preach the baccalaureate sermon in Bailey Hall on Sunday afternoon.

The committee on arrangements is endeavoring to inform every Cornellian of the plans for the celebration. If any reader of this article knows of a Cornellian who has not received the first circular, which was mailed about March 1st, he can do the University a favor by sending that person's name and address to the University Secretary, 31 Morrill Hall.

THE CORNELL COUNTRYMAN

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NEW YORK STATE COLLEGE OF AGRICULTURE AT CORNELL UNIVERSITY

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Home Economics Editors
GERTRUDE SAMPSON — RUTH NYE

ITHACA, N. Y., APRIL, 1919

WHY is it that so many people—particularly the city bred—would have farms reclaimed from waste lands given to the soldiers on easy payments? The basic idea of making useless lands productive is good, but the results would prove disastrous and an entire failure. Disapproving of the idea is not being ungrateful for the services of the soldiers nor is it favoring the creation of a "closed shop" in farming.

According to past statistics the number of farms in the country have greatly increased but the number of farm hands have not at the same rate. Yet, it is suggested to still more increase this difference and to still more increase the difficulty of securing farm labor. And these jobless soldiers could be better used in other ways. There are thousands of farms thru-out the country which are not entirely productive on account of lack of help. Added labor would mean increased production by improved methods of culture or the irrigation, drainage, or clearing of waste lands.

It should be remembered, moreover, that the farm labor question is not one to be settled so easily. The question is one of economics, and not to be adjusted by any law or regulation. As long as men find wages higher and living conditions more comfortable and desirable in the city, will there tend to be an oversupply of labor in the city and an insufficiency on the farm.

THE present very friendly attitude of the great majority of farmers towards the agricultural colleges and experiment stations has been brought about in comparatively recent years. Not so many years ago, before Farmers' Week became an institution, those who encouraged and helped the work of the college and station were very much in the minority. The great mass looked upon the experimentations as merely something for professors to fuss with. The college education itself was regarded as four years in which to give a young man a good time before he took up the serious business of life.

Now, however, we come to the realization that it is these institutions which make possible such things as Farm Bureaus, Farm Institutes, and cooperative organizations too numerous to mention. From a business standpoint alone, they are a sound investment for the state. In one particular case, a new variety of wheat introduced from an agricultural college paid to the state annually thirty times what the state pays for the support of the college.

THE COUNTRYMAN wishes to announce the election to the editorial staff of H. A. Stevenson, J. E. Fuller, P. M. Bungart, and to the business staff of D. Hoagland, A. N. Lawson, and E. L. Rich.

The Farm Home

Condensed Milk and Evaporated Milk

By FRANK E. RICE

Assistant Professor of Agricultural Chemistry at Cornell University

Most people do not have an accurate idea of the significance of names under which canned milk is marketed. There are many brands, yet there are but two distinct kinds, and only two, of concentrated liquid milk. Both contain considerably less water than is present in fresh cow's milk. Both are, therefor, condensed milks. However, the term condensed milk, is customarily applied to milk from which water has been withdrawn and at the same time sugar has been added, while evaporated milk is understood only as cow's milk with a part of the water removed.

Condensed milk contains from forty to forty-five per cent of pure granulated sugar. This sugar acts as a preservative, preventing the rapid growth of molds and bacteria. After opening a can of this product, there is little danger of spoilage; it may be kept even months without being iced. In the use of condensed milk in baking, in beverages, or on fruit desserts, either no sugar is required or less sugar than would otherwise be used. On account of the high proportion of sugar present, it has been used by some in place of sirup on griddle cakes.

Since evaporated milk does not contain this sugar nor any other substance to inhabit the growth of organisms, it cannot be depended on to remain good for very long after the can is opened. After the manufacturer fills evaporated milk into the tins, they are sealed and heated to very high temperatures. This kills all organisms, and it is therefore unnecessary to ice unopened cans; decomposition cannot begin until after the top is removed and contaminating material subsequently introduced.

During the processes of manufacture of both condensed and evaporated milk, the raw cow's milk is subjected to high heating. For this reason, the finished products cannot contain the objectionable bacteria, which are often present in the raw milk as commonly used. While this heat is sufficient to kill most bacteria, it is not great enough to destroy those recently discovered substances found in milk and which are necessary for animal growth—"food harmones," or "vitamines."

By adding one and a third to one and a half pints of water to one pint of evaporated milk, a mixture is obtained identical in chemical composition to that of cow's milk. If condensed milk be diluted in the same way, it will resemble milk to which about one-fifth its weight of sugar has been added.

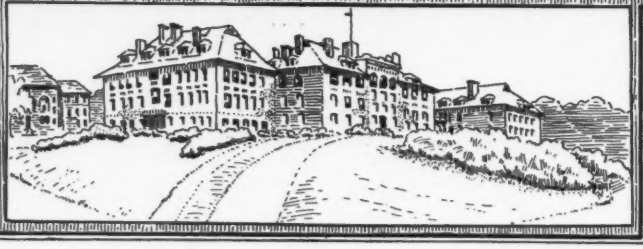
There is but little uniformity in the retail prices of canned milk. All brands of condensed milk, as well as of evaporated milk, are of nearly the same composition and food value, yet the consumer pays more dearly for some brands than for others. Tins of evaporated milk are obtained generally in six-ounce and pound sizes and sweetened condensed milk in eleven-ounce, fourteen-ounce and fifteen-ounce sizes; the larger sizes will be found more economical.

Raw milk, on account of its great bulk in water (about eighty-seven and a half per cent), and on account of the ease with which it spoils, is expensive to ship and handle. The cost of distribution has been found to be as great as the cost of production at the source. In the process of condensation, a large part of the water is removed; after canning, the product remains good indefinitely and requires no special attention. It is for these reasons that a condensary located near the source of supply is able to manufacture, transport, and market canned milk as cheaply as raw milk can be marketed in most cities.

There is another consideration in the

(Continued on page 152)

CAMPUS NOTES



Semi-Centennial Forum

A committee is formulating plans for the college forums which are to be held in the different colleges of the University during the coming semi-centennial in June. The purpose of these forums is to bring the alumni together in order to discuss the various college problems. Certain of the alumni will be requested to come a little beforehand to acquaint themselves with the existing conditions. The forums will be held in the different colleges on Friday, June 20; and on the following day all will meet in a general forum. These meetings should be very well attended as the committee is planning for a very large gathering of alumni.

"Botanical Abstracts"

A noteworthy movement in botanical science is the new journal, "Botanical Abstracts," inaugurated early in 1918. The rapid advance of botanical science and the great activity of workers in its various fields have led to the publication of such a volume of material that it has become quite impossible for any one worker to consult even that portion relating to his own specialty. A real demand has therefore developed for an international botanical abstracting journal, which thru the publication of short abstracts will call to the attention of all workers the current contributions to the various branches of botanical science the world over.

A comprehensive plan is being inaugurated for insuring that all botanical articles appearing in the literature of the world are abstracted. This involves the assignment of between two thousand and three thousand botanical serial publications to collaborators—workers in the various botanical fields throut the country who have expressed a willingness to cooperate in the work. Fully four hundred collaborators have already been secured and the work of assigning publications to them is under way.

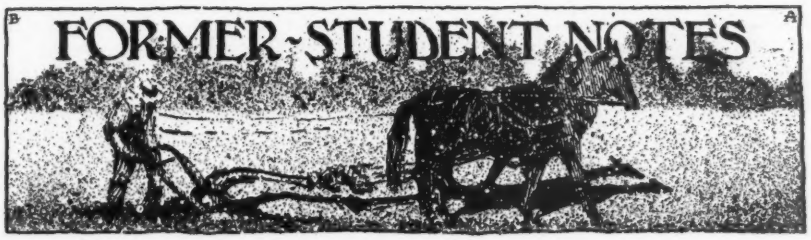
The new journal is in charge of a Board of Control of which Dr. Donald Reddick, of the department of plant pathology in this college, is chairman. Editorial responsibility for the journal is in the hands of a board of sixteen editors, of which Drs. Reddick, Chandler, and Schramm of this college, are members.

This important international scientific service is made possible largely thru the generous cooperation of the College of Agriculture.

The Seed Special

The department of farm crops and the department of plant pathology united in sending out a "Seed Special" during the first two weeks of March. This "Seed Train" contained samples of various cereal grains and grasses, besides illustrations of cereal smuts and demonstrations as to how they should be treated. The main idea the department of farm crops wished to convey to the farmers of the state was that it would be a lot better to concentrate on one or two varieties of grass or grain seeds and thoroly develop these, than to try a great many without achieving any conclusive results. This department showed

(Continued on page 154)



'99, B. S.—Mrs. Helen Gibbs Drake, wife of Allen Norton Drake, died at her home in Buffalo on March 6. She leaves her husband, a three-day-old son, three sisters, two brothers, and her mother, Mrs. Ann T. Gibbons of Ithaca.

'05, B. S.—J. W. Swaine of the Canadian Entomological Division is spending some time at Cornell completing his work for the degree of Ph. D. Mr. Swaine has already published a monograph on "Canadian Bark Beetles." He is from Ottawa, Canada, and is one of the authorities in this country on the common bark beetles.

'07, B. S.—R. S. Moesley, a former extension instructor, has accepted a position as manager of the Sunny Crest Poultry Farm at East Aurora.

'09, B. S.—G. N. Wolcott, who has been with the A. E. F. in France, has returned to this country and is beginning his work for his Ph. D.

'10, B. S.—A. E. Boicourt, formerly in charge of an experimental plant, is managing the poultry at an estate in West Park.

'11, B. S.—Alvin J. Nitzsche is county agent of Fanning County, Georgia, with offices at Blue Ridge.

'11, B. S. A.—Lieutenant Waldemar H. Fries resigned his commission on January 4 and is now with the Pyramid Silks Corporation, 150 Madison Avenue, New York, being temporarily located at Allentown, Pennsylvania. His permanent address is 129 Columbia Heights, Brooklyn.

'12, W. C.—H. B. Buchan, a winter course student, is superintendent of an estate in West Park.

'13, B. S.—Mortimer D. Leonard, who was in charge of the Erie County Field Laboratory for the Pennsylvania State College, has been appointed field assistant in the U. S. Bureau of Entomology. He has been assigned to extension work on the truck-crop insects of Long Island in cooperation with the department of entomology.

'13, B. S.; Ph. D., '17—Charles Paul Alexander is now in the University of Illinois, taking the place of W. Hart in the department of the entomological collection of the Natural History Survey of Illinois.

'13, B. S.—James S. Wight is horticulturist with the Tallahassee Pecan Company, owners of a thirty-five thousand-acre pecan grove at Tallahassee, Florida.

'13, B. S. A.—Ralph H. Denman is with the Peninsular Portland Cement Company of Jackson, Michigan. His address is 218 West Wesley Street.

'13, B. S.; '18, Ph. D.—Frans E. Geldenhuys is teaching nature study, natural sciences, and agriculture in the Grey College School, Bloemfontein, South Africa. Andries P. van der Post and he are cooperating in providing articles and news on agriculture in a monthly publication, Lewe en Strewe, a South African magazine devoted to the interests of vocational training, the farmer, the manufacturer, and the commercial man.

'13, Sp.—Abram L. Dean is a member of the staff of the U. S. Bureau of Animal Industry as poultry specialist and is stationed at the Massachusetts Agricultural College. He is also poultry club leader for the state. His address is 24 Pleasant Street, care M. A. C. Faculty Club, Amherst, Massachusetts.

'13, B. S.—C. W. Barker is farming at Spencerport.

'13, B. S.—Dudley Alleman is with

the U. S. Department of Agriculture in the bureau of markets. His address is 212 Willow Avenue, Takoma Park, D. C.

'14, B. S.—H. H. Knight, who has been in command of men in the Photographic Section of the Aviation Division in France, has returned to this country and expects to resume his work in the department of entomology here in a few weeks.

'14, B. S.—L. E. Card, assistant professor in the Connecticut Agricultural College, is coming in the near future to Cornell to study for a doctor's degree.

'14, B. S.—S. C. Bishop, who has been New York State Entomologist since leaving college, is now an ensign in the U. S. Naval Reserve Force.

'14, B. S.—Arnold E. Davis is farming at Livonia.

'14, B. S.—Roger H. Cross is farming with his brother at Fayetteville. They are specializing in potato raising and breeding.

'15, B. S.—B. E. Barringer, who has been teaching vocational agriculture at Dansville since graduation, has resigned and, beginning next fall, will take up graduate work at Columbia University.

'15, B. S.—D. T. Crandall, recently discharged from service, has returned to his position as teacher of agriculture at Westfield.

'15, Sp.—Ernest Rathbun is with the Forest service in northern France repairing roads.

'15, B. S.—Cecil R. Gross is now in Germany with the Army of Occupation. He is attached to Field Hospital 132, 108th Sanitary Train. During the last few months of the war, Gross saw service on the Argonne-Meuse front.

'15, B. S.—William P. Brodie married Ruth E. Johnston of Newburgh last July. He is demonstration agent of Salem County, New Jersey.

'15, B. S.—L. J. Steele is manager of the Orleans County Farm Bureau with headquarters at Albion.

'15, B. S.—E. C. Weatherby is the manager of the Cayuga County Farm Bureau with headquarters in Auburn.

'15, B. S.—F. W. Furst has been discharged from the spruce production division of the army and is living at 110 East State Street, Ithaca.

'16, B. S.—Miss Helen E. Saunders is teaching biology in the Winsor School, Boston, Massachusetts. Her address is, The Stuart Club, 102 Fenway Street.

'16, B. S.—First Lieutenant Ralph E. Griswold of the Camouflage Section has been assigned to the 103rd Engineers, 28th Division, still in France.

'16, B. S.—L. H. Woodward, just returned from active service in France, has been elected teacher of agriculture at Greene.

'16, B. S.—W. A. Hoffman is employed in the department of entomology at Monticello, Florida.

'16, B. S.—Announcement has been made of the engagement of Edith B. Schrader of Saranac Lake to Harwood Martin of Honeoye Falls.

'16, B. S.—F. R. Perry has been discharged from the Army and is at his home in Churchville.

'16, B. S.—A. G. Allen has been discharged from the Aviation Section of the Army and is at his home in Salisbury, Maryland.

'16, Sp.—W. A. Kibbey has been discharged from the Artillery Officers' Training Camp at Louisville, Kentucky, and is at his home at 1401 Emerson Street, Washington, D. C.

'16, B. S.—W. L. Webster is on the Post farm at Stanley.

'17, B. S.—T. B. Augur is with the Friends' War Victim Relief Corps, a branch of the American Red Cross, in France.

'17, B. S.—Henry E. Haslett is government sheep specialist for the State of Massachusetts and assistant in the department of animal husbandry at the Massachusetts Agricultural College. His address is Lincoln Avenue, Amherst, Massachusetts.

'17, B. S.—Edwin C. Smith, who was a first lieutenant in the Air Service, has been discharged and is living at 93 Clinton Avenue, Brooklyn.

'18, D. V. M.—Harry P. Wynne has been discharged from the Veterinary Corps of the Army and is living at 140 Oak Street, Binghamton.

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Ex-'18—Guy Rickard is an ensign in the U. S. Naval Aair Force at Miami, Florida. Rickard was the University rifle champion and captain of the rifle team before he left in 1917.

'18, B. S.—Fred Kraus and R. B. Bush are employed as chemists with Nestle's Food Company in New York City.

'18, B. S.—S. E. Van Horn is now dairy inspector for Nestle's Food Company.

'18, B. S.—Alfred E. Emerson is research assistant at the Tropical Research Station of the New York Zoological Society in British Guiana. He is engaged in research work in ornithology and entomology under the direction of William Beebe, Curator of Ornithology at Bronx Park. Emerson expects to return to "the States" next October.

'18, B. S.—Miss Dorothy M. Gray has an office in Billings, Montana, where she is practicing landscape architecture. Her address is Box 1204.

'18, B. S.—A. Stanley Burchard is a private in the Chemical Warfare Service and assigned to Company F, 2nd Battalion, stationed at Edgewood Arsenal, Edgewood, Maryland. His mail address is Oxford.

'18, B. S.—Corporal Thomas R. Wagner of Philadelphia has been admitted to the Third Marine Officers' Training Camp at Quantico, Virginia, from which he expects to graduate on June 15. He is in Company B.

'19, W. C.—R. C. Ogle has received an appointment as an extension man in the Poultry Department. He is working with the poultrymen of Rockland, Orange, Ulster, and Sullivan counties.

Ex.-'19,, B. S.—M. W. Postman is chemist in the Medical Corps at Camp Pike, Little Rock, Arkansas.

Ex.-'19, B. S.—Leo Guentert is employed as chemist for Nestle's Food Company at the Ithaca factory.

Ex.-'19—J. F. Lane has been commissioned Assistant Paymaster in the Navy with the rank of ensign. He received his training at the Assistant Paymasters' School at Princeton University.

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Organizing Agriculture as a Business

(Continued from page 120)

of agriculture, the farmers' institutes, clubs, and associations of various kinds, with the agricultural press, are doing a fairly good job in disseminating information and in furnishing the opportunity for comparing experiences. This much of the ground would seem to be fairly well covered. But organization for the development of agriculture in a business way is yet in its infancy. It is to be hoped that the various state associations reaching out thru the county farm bureaus to every community of the several commonwealths may so develop in power and in procedure as to bring about a new era in the development of agriculture as a great national business.

American Potash in Crop Production

(Continued from page 122)

interesting to note that increase of potash in the fertilizer, about three per cent, did not correspondingly increase the yield.

These figures reveal an effect that has been observed in other places, namely, that a poorly balanced fertilizer, especially if very high in nitrogen and lacking in potash, lays the plant open to attack by disease organisms so that it goes down even sooner than where no fertilizer were used and produces a corresponding lower yield.

Bearing on the general value of potash in the fertilizer, the results at the New England experiment stations quite generally assign a larger value to potash than phosphoric acid. Thruout the middle west phosphoric acid has been regarded as relatively more valuable than potash in the fertilizer. The accuracy of this suggestion may be seen in a summary of the long-time records at New York, Pennsylvania, and Ohio in standard rotations.

From the data, it appears that in New York the effect of potash alone in a complete fertilizer has increased the value of nine crops by $28.19 over the

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FIELD OF 8 1-2 ACRES INSPECTED

	IN FIELD		IN CELLAR	
For	July 23	Sept. 19	For	Oct 10
Mosiac	None	None	Common Scab	None
Blackleg	None	None	Powdery Scab	None
Leaf Roll	None	None	Rhizoctonia	None
Early Blight	None	None	Late Blight Rot	None
Wilt	None	Trace	Stem End Burning	2 per cent
Varietal Mixture	1 per cent	1 per cent	Varietal Mixture	None
Late Blight	None	None		
Curly Dwarf	None	None		
Tip Burn	None	Slight		
Weak hills due to other causes	Trace	Trace		
Missing Hills	1 per cent washed out	2 per cent washed out		
Flea Beetle	None	Trace		
Potato Bug	None	None		

Soil Type	Lilt Loam
Total Yield	1800 bushels
Cultivation	Good
Seed	Hill Selected
Treatment	Cor. Sublimate
5 Sprayings	Bordeau

Inspected by Cornell Pathologists, Hardenburg, Whetzel and Stevenson for the State Potato Growers' Association, 1918

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Standard brand		
4-8-3	261	44
Nitrogen all nitrate		
4-8-3	287	70
4-8-6	269	52
4-8-10	263	46
4-8	217	
Average 4 plots no fertilizer	189	

effect of nitrogen and phosphorus alone, while phosphoric acid has increased it $11.31. In Pennsylvania, potash in a complete fertilizer has increased the value of crops per four year rotation by $8.19, while phosphoric acid has caused an increase of $31.87. In Ohio, in the five year rotation, potash in the complete fertilizer increased the value of crops $7.94 per rotation, while phosphorus has increased it $28.21. In the three year rotation with potatoes, potash has caused an increased value of $6.40 per rotation, and phosphoric acid increased the value per rotation by $8.22.

The net increase in value would be secured by deducting the cost of the treatment. In the amounts in which the materials were used there was not always a profit. But this is no reflection on the fertilizer. It indicates the need of a better adjustment of the amounts used to the needs of the soil and crop. With scarcely any exception, the value of the potash as well as of the other three elements is indicated.

It can, ~~therefore~~, be expected that potash will come back into commercial fertilizer but in more conservative amounts than was formerly used for the ordinary farm crop.

American Production of Potash

The high prices of potash that have prevailed during the war have stimulated the development of several American sources. First of all, the nitrate of soda coming from South America has long been known to contain a small per cent of potash, but it was not until war prices prevailed that its recovery was practicable and that the process was undertaken. It now comes into the market as nitrate of potash, which material carries about 15 per cent of each constituent.

In 1918, the United States produced about 75,000 tons of actual potash. Two-thirds of this came from the brackish lakes of western Nebraska. A mixture of salt which is obtained by merely evaporating the water of these lakes under crude conditions contains about 30 per cent of water soluable potash.

The nearest approach to the European deposits of potash is the Searles Lake area in California. There is a deep underground deposit, which has long been subject to litigation and which has only just begun to yield important amounts of potash.

Much has been said about the sea weeds or kelp of the Pacific Coast as a source of potash. These plants resemble giant stems which grow up from the bottom of the ocean in shallow water. When dried and charred (to drive off part of the organic matter) the material contains about 30 per cent of potash. The Federal Government has constructed an experimental factory in southern California for its production. The farmers of Nassau County, Long Island, were fortunate enough to secure a carload of this kelp potash from the government factory for the present season's crop.

The most promising sources of American potash are the cement mills and the blast furnaces. In the clay and limestone used in making cement and in the ores and fluxing materials used in the blast furnace, there is a very considerable per cent of potash. Part of this is thrown off as dust and vapor in the process of heating the materials in the furnace. An electrical process has recently been devised to collect this dust, which from the cement mill contains from 8 to 12 per cent of potash and about 30 per cent of lime. About 2 pounds of potash is produced per barrel of cement. The recovery of potash is

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found to be increased from about 25 or 30 per cent to over 60 per cent by the introduction into the furnace of common salt. The potash in this dust is only slightly soluble in pure water, but is said to be soluble in slightly acidulated water and should, therefore, be available to plants. It has not been tested out in crop production as yet, but it has a good future.

It has been estimated that the recovery of potash from the blast furnaces of England may be made equal to the total consumption of potash in that country before the war. The process of recovery is inexpensive. The European mines seem likely to have considerable competition with the by-product potash. Suggestions are on foot to protect the American manufacturer of potash in order to insure an independent supply in such critical periods as the world has just passed thru. Some degree of protection is good public policy.

But the most easily available and cheapest source of potash is from ordinary barn yard manure.

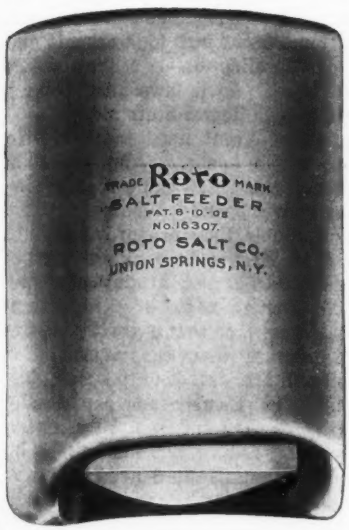
Manure carries from eight to twelve pounds of potash per ton and a six to ten ton application is equal to a ton of three or five per cent potash fertilizer. Data now available indicates that twenty to forty pounds of potash per acre even for potatoes will generally give very good results.

No potash will be available from European mines before fall, and it will not get mixed into fertilizer before the spring of 1920.

Two Farm Necessities

(Continued from page 126)

fer, they can continue to allow the conditions on farms to be such that the city is so much more attractive than the country that everyone wants to go to the city. Or conditions may be made such as to lead a reasonable proportion of the population to live on farms. The number of persons engaged in agriculture in New York in 1840 was 455,954; in 1910 it was 372,410. This shows how success-



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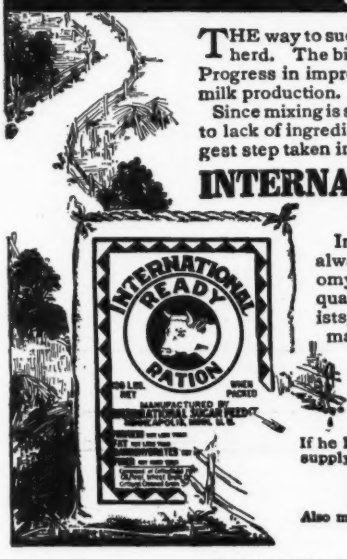

THE way to success in milk producing lies through care of the herd. The biggest essential of proper care is proper feeding. Progress in improving the ration means progress in increasing milk production.

Since mixing is so important, why risk unbalanced mixtures due to lack of ingredients or non-uniform mixing? Here is the biggest step taken in feeding during a decade—a ready mixed feed

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ful the making of the conditions of life in the cities attractive, without making similar improvements in the country, has been.

The present plan of paying high school tuition for non-resident children with the proposed increase in pay is a help, but it is not sufficient. In fact, it tends to prevent the construction of new high schools, because, while the State pays tuition if no school is maintained, it does not provide equal help when a small high school is constructed.

Many new high schools are needed in the State. A survey should be made of the available schools in each county with recommendations as to places where new high schools are needed and recommendations as to places where transportation is needed. The plan should be such as to make a high school available to all children in the State. Conditions in New York are too diverse to be covered by a single law. In some cases transportation is needed. In other cases the tuition law is sufficient. In other cases new high schools need to be built. Laws should be so framed as to encourage the construction of new high schools and to favor consolidation of schools where it is desired. Such laws should be permissive with liberal State aid.

Another great need in rural life is more stone roads. Who could have foreseen the great value that the state roads have been? Where such roads are available they are proving to be a powerful factor in making farm life more attractive and farming more profitable. Enough about road construction is now known so that a great road building program thru cooperation of the Nation, State, and County should be entered into. Some roads are used primarily for thru travel and are national highways. Such roads need to be built very substantially and need to be very wide. Other roads are used primarily by citizens of one State, but one community or one state no longer lives to

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itself alone. A detailed survey of the present roads of every county with recommended plans for road improvement is needed. Some new roads need to be laid out; others need to be changed at some points; others should be closed. The present traffic on state roads should be studied with respect to its volume and the distance that each load moves. Such a road building program should be continuous but should be pushed with vigor during the periods of unemployment. The only way that this can be done is to have complete detailed plans made long in advance.

Some Insect Pests of the Apple

(Continued from page 130)

August and September the partly grown larvae migrate to the branches and pass the winter in their silken cases, ready to attack the buds again in spring.

In cases of serious infestation, the trees should be sprayed with arsenate of lead, 2 pounds to 50 gallons of water, as the flower clusters begin to appear; repeat just before the blossoms open. If these two applications are followed by the first codling moth spray after the petals fall, the insect should be fairly effectively checked.

The San José scale, formerly considered one of the worst fruit pests in this country, is apparently on the wane, at least in the East. Parasites, short season, and perhaps other factors, have contributed to the decline of this insect in New York State. It is not yet, by any means, a pest to be neglected or overlooked and should still be fought with persistence if present in an orchard. The insects pass the winter in a partly grown condition beneath tiny, circular, black scales on the branches of the trees. In the spring they become full grown, and in a normal season a generation is produced in about fifty days. In long, warm seasons there may be three broods in New York State while in cool, short summers not more than two generations may be produced.

The universal spray mixture for this insect is lime-sulfur, 1 gallon to 8 gallons of water, when it tests about 32°

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Lansing Tile Silos are unaffected by weather changes—have no up-keep expenses,no hoops to tighten, no painting—the low first cost is the **last.**

The Lansing Block. Note fluting in block to prevent mortar from slipping. Blocks set together—tile braced against tile.

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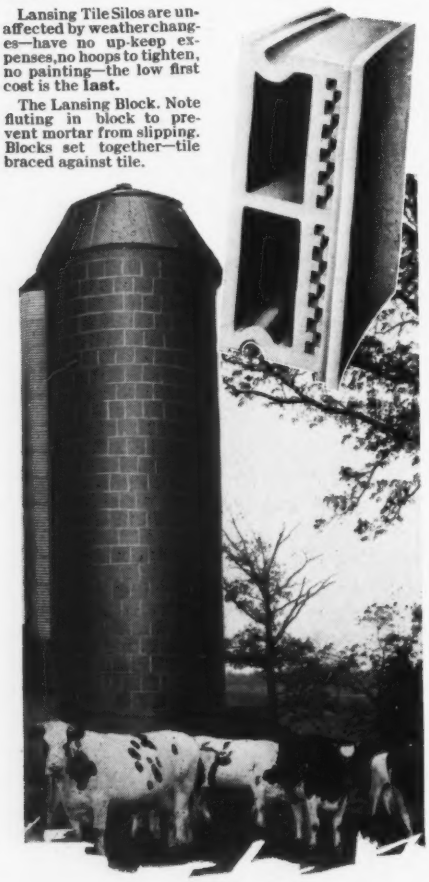

Baumé. It may be applied in fall or spring and in cases of bad infestation should be applied at both of these periods.

The spring canker-worm is a widely distributed pest of the apple, and altho not now as serious in New York State as formerly, it should be watched. The females are wingless and must crawl up the trees in order to deposit their eggs. Consequently they may be caught in large numbers by banding the trunks of trees with tanglefoot. The tanglefoot should be spread on a band of tarred or other heavy paper tied around the trunk with all of the cracks and crevices in the bark beneath filled with cotton. These bands should be applied in late February or early March. In addition the caterpillars may be killed while young by spraying infested trees with arsenate of lead, 5 or 6 pounds to 100 gallons of water. Thoro cultivation of infested orchards in August and September destroys the pupae.

The apple-tree tent-caterpillar often occurs in large numbers over wide areas and defoliates the apple trees if spraying is neglected. The eggs are deposited during the last of June or first of July in ring-like masses encircling the smaller branches. They do not hatch until the following spring just as the buds are swelling. The young caterpillars attack the buds and soon build silken, tent-like nests in the crotches of the branches. Infested trees should be sprayed while the larvae are young with arsenate of lead, and the application should be repeated in a few days if necessary. The egg-rings may be collected during the fall, winter, and spring and destroyed. Wild cherries and seedling apple trees along fence rows and in neglected places should be destroyed because they serve simply as breeding places for these pests.

The apple maggot is a native insect that originally fed on thorn apples. The small, white maggots tunnel thru the flesh of the apple and finally cause decay and total ruin of the fruit. The flies have a habit of sipping food from the surface of the leaves and fruit and may be poisoned by spraying the trees

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with a sweetened poison mixture composed of 2 pounds of arsenate of lead and a gallon of water. For summer and early fall apples the first application should be made in early July and repeated one or twice if the infestation the previous year has been serious, or if rain has closely followed the first application and has washed it off. Thoro and clean cultivation of neglected and badly infested orchards seems to aid in checking the pest.

The plum curculio is an old offender in scarring and deforming apples. Fruits punctured early in the season are liable to drop, but if they remain on the tree they often become knotty and deformed. It injures the apples by making crescent-shaped egg scars on the fruit, which, as the apple grows, gradually expand and develop into characteristic, shield-shaped, russeted scars. In addition to this the curculios feed on the fruit making circular, shallow cavities in the sides of the apples. Often, especially late in the season, these pits become deepened and enlarged, and the orifice of each becomes surrounded with a narrow black ring of skin.

In preventing ravages of the plum curculio, it is important to practice clean cultivation of the orchard, to clean up all hedgerows in the vicinity, and to prune the trees judiciously to admit sunlight, for sunlight and heat are destructive to the grubs of this insect. In addition, thoro applications of arsenical mixtures, especially the first and second codling moth sprays, are perhaps the most important means of prevention. The applications should be made in a thoro, careful manner.

Condensed Milk and Evaporated Milk

(Continued from page 153)

use of canned milk, which is of vital importance both to the consumer and to the common good—there is no waste; that which is not consumed today or tomorrow may be used afterward. Then, too, altho concentrated canned milk di-

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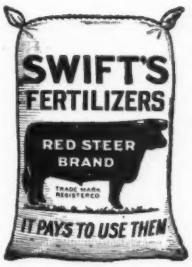

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luted with water may contain the same nutrients and in the same quantities as were originally present in the raw milk, yet certain enzymes, which are found in fresh cow's milk, are destroyed in the cooking, and it has sometimes been claimed that these are desirable in contributing toward the digestibility of milk. Boiling of milk also changes its flavor. For these reasons, canned milk may not soon take the place of raw milk entirely, yet the history of the industry has shown that where communities have become accustomed to it, its use gradually increases.

From Live Cattle to Beef

(Continued from page 128)

tor, who then designates what disposition shall be made of the carcass.

27. The "splitter" chops thru the spine down to a point close to the shoulder.

28. The "hang off" hoists the bullock to an elevated position where he may be hung on roller trolleys, equipped with hooks and operating on rails suspended from the ceiling. The spreaders are removed from the hocks at this point and the hooks of the trolleys are inserted in their place. The bullock is then pushed to a position farther back on the floor.

29. The "hide dropper" skins the shoulder and forearms and drops the hide to the floor.

30. The "chuck splitter" splits thru shoulder and neck. The bullock is now divided into halves.

31. The conveyor chain takes the sides of beef over the wash rails.

32. The "wash gang" trims, scrubs, sprays, and finishes the sides of beef as they travel along a system of overhead rails. They are then ready for the representatives of the U. S. Bureau of Animal Industry, who make a final examination, considering cleanliness, blemishes, and any other points that may have been missed.

From the wash gang, the conveyor chain takes the sides of beef to the doors of the chilling rooms or "coolers."

In order to have an appetizing flavor and to make possible the preservation of the meat, it is necessary to remove the animal heat. That is done by chilling. In former times, before mechanical refrigeration came into use, the location of the packing house depended as much on the availability of an adequate supply of ice as on shipping facilities. Chill rooms then were only ice boxes with bunkers overhead, into which tons upon tons of ice had to be placed. Slaughtering plants were, therefore, located near places where ice could be harvested and stored for a year's requirement. At best it was a case of speculating on the elements. An open winter was a period of great anxiety, and if the crop of ice was not forthcoming, it meant shipping in ice from a distance at great expense.

Present-day mechanical refrigeration and ice-making has obviated all of this. By having two refrigerating machines (the one in use and the other in reserve), and by taking hourly temperatures day and night, the matter of preservation of meats has been placed on a scientific basis where results are an unfailing certainty.

In conclusion, it can be said for the modern abattoir that every possible mechanical aid that could be thought of has been provided. The arrangement of turn-tables, hoists, spreaders, and conveyors has reduced heavy physical effort to a minimum. The men are under no mental or physical strain.

Campus Notes

(Continued from page 134)

samples of silage corn with the varieties, Luce's Favorite and Hall's Golden Nugget, suitable for most of the state. For the higher altitudes and northerly areas Cornell No. II and Bailey's Dent were recommended. For ear corn Cornell No. II and Early Huron were advised for the better part of the state, while for the rest of the state the kind of flint corn used in Dutchess County was recommended. The varieties of oats

shown were the Banner and Swedish Select. In the potato exhibit emphasis was placed on the selection of groups rather than special varieties themselves. For sections with cool climate and light soils the Cobbler group (early) and the Green Mountain group (late) were recommended. Those sections of the state with hot summers and a heavy soil were advised to use the Rose group (early) and the Rural group (late). For spring wheat seed the Marquis variety was best adapted. There was also an exhibition of soy beans and Canada field peas, which were recommended largely for their use with corn and oats as silage. Still another exhibit, the grass seed exhibit, showed samples of alfalfa and mixed grass seed. There were demonstrations showing how these seeds were often mixed largely with weeds. The farmer was advised to watch carefully for any fraud such as this.

The plant pathology department prepared samples of potatoes, beans, and cereal seeds, showing the stages of the plant diseases upon them. They instructed the farmer as to the proper methods of control and prevention for these diseases. This department also visited various potato seed farms, and a record was kept of those places where good, healthy seed may be secured. Both departments have prepared a list of farmers who will sell seeds which has been shown to be of good quality and fit for use thruout the state. This list may be secured by writing to the department here in the college.

Dr. A. H. Sharpe, who has been coach of Cornell's football, baseball, and basketball teams since 1912, will sever his connection with the University in the spring and return to Yale, his Alma Mater. Doctor Sharpe goes to Yale as Director of Athletics, in which capacity he will have charge of the same teams he has supervised at Cornell. In addition to his duties as coach, however, Doctor Sharpe is further charged "with the responsibility of cooperating with

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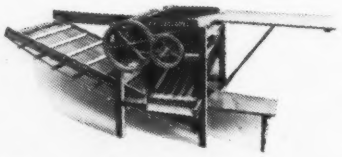

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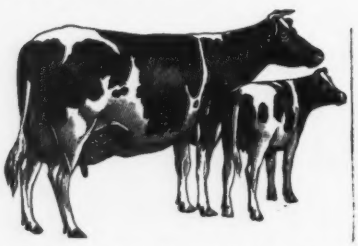

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coaches and captains of all teams in Yale University, whether formal or informal; to maintain the highest traditions of amateur sport; to develop and maintain the morale of all such teams and the members thereof; and to keep athletics at Yale on the highest plane of honor and integrity as well as efficiency."

In the inter-college cross country race held on Saturday, March 8, the College of Agriculture, the winners last year, finished second. J. K. Wardwell, '22, M. E., was first to cross the finish line, with S. M. Abrams, '20, Ag., a few yards in the rear.

Recently the department of animal husbandry made two important purchases. One was a Percheron stallion to head the stud at Cornell. For some time the department has been making quiet inquiry among the more noted breeders and importers thruout the central west and finally Olifant 142267 (120297) was selected. This horse was imported from France last year by Truman's Pioneer Land Farm of Bushnell, Illinois.

Olifant was foaled April 15, 1914, and was bred by Voe Broward, Department of Eure et Loir, France. He traces back to some of the best Percheron blood of France. He was selected to lead the stud at Cornell because of his outsanding evidence of quality, substance and endurance, for in these characteristics his equal is not often found. Olifant is black with narrow trip and sinip, stands sixteen and three-quarters hands and when loaded at Bushnell weighed over 1900 pounds.

The other purchase was a Holstein bull calf which will be a year old in April. His name is Great John Lyons, and he was purchased from H. A. Moyer of Syracuse.

The calf has King John for his sire and Betty Lyons for his dam—the latter the thirty-pound daughter of King Lyons. Her great-day is Bertha Lyons

Netherland with a record of thirty-four pounds of butter in seven days. She is out of Blanche Lyons Netherland who also has a thiry-four-pound record. Thus the calf is one of those rare animals whose pedigree shows three consecutive dams each of which has given thirty or more pounds of butter in seven days.

The calf has only a few black markings, carrying three crosses of King Segis; and in his pedigree one can find twenty-nine cows whose seven-day records average thirty pounds of butter. According to Mr. Moyer, the dam is the greatest bred daughter of King Lyons that he ever owned.

Dr. L. A. Maynard, chemist of the department of animal husbandry, is at present stationed at Bar-sur-Aubey in France. He is with the headquarters of the First Army as divisional gas officer in the Gas Defense Service. Under date of February 19, 1919, Dr. Maynard writes that it is impossible for him to state just when he will be able to leave France.

Dr. Maynard was commissioned as First Lieutenant in the Gas Defense Service in the Sanitary Corps in November, 1917. During his service in France he was advanced to Captain, and recommendation for promotion to Major had been made, but this recommendation was not acted upon because all recommendations for promotion were held up by the signing of the armistice.

During the week of March 10, Profesor L. J. Cross of the department of agricultural chemistry assisted in the instruction in the extension school at Canton.

The department of agricultural chemistry will rearrange and extend its courses to be given next year. The chemistry of foodstuffs will be covered in both chemistry and advanced courses. It is planned to schedule a regular outline of courses to be taken, both in the

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department and outside, which will fit the student for the position of chemist in the food industries and other laboratories controlling the manufacture and sale of food products.

A beekeepers' school was held at Cornell during the week of February 24 to March 1 by the department of entomology in cooperation with Dr. E. F. Phillips and G. S. Demuth, of the Bureau of Entomology in Washington, D. C. The attendance and interest were very gratifying, the total registration for the week being 145. Beekeepers from Canada, Michigan, Connecticut, Pennsylvania, and New Jersey, in addition to those from New York, were in attendance.

Professor E. S. Savage, of the department of animal husbandry, addressed the sixteenth annual meeting of the New York State Millers' Association at Buffalo on Tuesday, March 18. The subject of his talk was "A Farmer's Ideas of Feed.'

Since the beginning of the fall term, 1918-1919, the following additions have been made to the faculty: Homer C. Thompson has been appointed to the department of vegetable gardening; William J. Wright, state leader of junior extension work, is now a professor in the department of rural education; A. H. Hendrickson is assistant professor in pomology; and Helen Monsch is assistant professor in home economics.

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Robert Bier, of the department of vegetable gardening, has resigned in order to acept a position with the Office of Crop Estimates in the U. S. Department of Agriculture. For the present, Mr. Bier's headquarters will be at Ithaca.

The new State Armory and Drill Hall was first used for an all-Cornell event on the evening of March 8. The two-fold purpose of the affair was to celebrate the receipt of the New Armory by the Cornell community and to add to the funds of the Athletic Association. Under the frankly descriptive title of "Hardly Fair," the housewarming committee surely "put across" the "best good time" since the last Spring Day, nearly three years ago.

Some twenty side-show booths were arranged about the sides of the huge hall in the form of a "C" and a large space for dancing was roped off in the center. Besides all the ordinary features of the midway, there were "The Portrait Painters" and "Cornell Hardly Done," not to mention the Layfayette stage-coach, wherefrom any number of folks might see the whole world thru a port hole.

Of course, "Colonel Grand Hoax Hardly" was really the only personage of international reputation in attendance. But it goes without saying that he got away with enough "pep" to completely rejuvenate the Paris Peace Conference, whose special envoy he was to the Fair!

The total receipts were $2547.16. Expenses amounted to about $1066.00, showing a gain of some $1500.00 for the treasury of the Athletic Association.

The annual College elections resulted in the election of the following officers:

Agricultural Association

Vice-president, Miss Helen Bool, '19; secretary, E. C. Estabrook, '20; athletic director, E. Davenport, '20.

Senior Class

President, P. L. Dunn; vice-president,

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Junior Class

President, J. T. Van Doren; vice-president, Miss Mary Moore; secretary and treasurer, E. M. Collins; representative to Agricultural Association, D. Hoagland.

Sophomore Class

President, C. W. Nordgren; vice-president, Miss M. Aldrich; secretary and treasurer, J. R. Fleming; representative to Agricultural Association, J. B. Hunt.

Freshman Class

President, E. T. Rumsdorf; vice-president, Miss M. Eldridge; secretary and treasurer, D. P. Rubel; representative to Agricultural Association, T. K. Bullard.

At a recent meeting of the Athletic Council the following "Ag" men were awarded "C's" or numerals: J. P. Egbert, '18; F. E. Quick, '19; Edward Davenport, '20, and Geoffrey Knight, '20, "C's" for last year's 'varsity crew. M. N. Thompson, '21, numerals for last year's freshman crew; and W. R. Schlicter, '22, numerals won at the underclass track meet February 8.

Oliver Wilson, Master of the National Grange, in his speech of Farmers' Week called attention to the fact that labor thru its unions is declaring that wages must not go down. Their cry is "Cheaper Food and High Wages." Mr. Wilson showed that this is impossible if the farmers are to be maintained in this country. If food goes down in price, wages must also decrease. The speaker also deplored the fact that the price was set upon wheat, but the price of farm implements, manufactured articles and fertilizers have been allowed to greatly increase. Mr. Wilson suggested that if the price was to be fixed on farm produce, it should be fixed on the basis of an eight-hour day and not on the basis of the

ordinary farmer's ten to fourteen hour day.

Yet despite all this apparent discrimination, the farmers have given the government less trouble than any other class. Furthermore, the farmers of this country have stood by the nation during this great crisis. They have lent their hands to the victory and now in the coming days of reconstruction, they should get together for the promotion of their own interests. Mr. Wilson, as did all the speakers during the week, emphasized the value of cooperation. The farmers must come to it if they are going to be felt as a power in the nation. The consumer and the farmer sooner or later must see each other's viewpoint and stand side by side not only for their best interests but also for the best interests of the nation.

H. W. Collingwood, editor of *The Rural New Yorker*, introduced a new note into the scientific buzz and hum of Farmers' Week. In his talk on "The Sunny Side of the Barn," he emphasized the need of some imagination, faith, and hope of life in the daily lives of farm children. In his conception the aim of education is to keep alive the faith and hope of childhood, since the visions of youth are the strongest influences of life and since it is the happy, hopeful children who make useful citizens. Mr. Collingwood said that as we have crowded music, poetry, and love out of education, we are pushing the children from the sunny side of the barn—the comfortable and happy side of life where they feel the joy of living—to the frosty side where work is done under compulsion and where the children come to feel they are doomed to stay. The old idea that boys would work better on the frosty side of the barn, is passing. In its place is coming the new one of putting joy and faith and imagination into their work, that they may remember happy childhood pictures and learn to feel the thrill of opportunity and the joy of living always on the sunny side of the barn.

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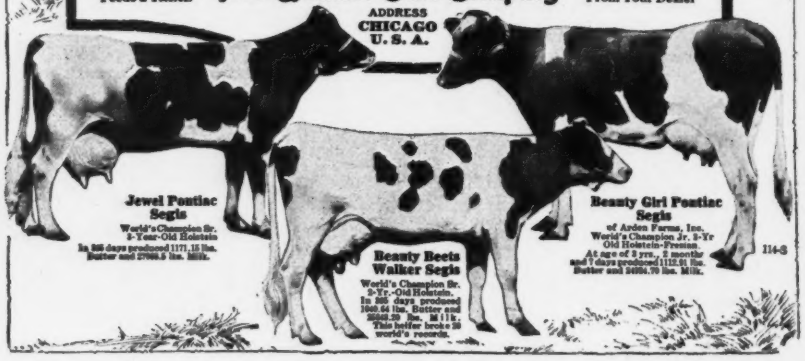

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